4.8 Argonne National Laboratory-West

Argonne National Laboratory-West (ANL-W) was established in the 1950s by the Atomic Energy Commission to support advanced nuclear reactor and nuclear fuel design and testing. ANL-W is located approximately 32 miles west of Idaho Falls, Idaho, in the southeastern portion of the INEEL. The ANL-W administrative boundary covers approximately 1,200 acres (see Figure 4-8). All facilities within ANL-W are currently active with the exception of the EBR-II research reactor, which has been defueled and is undergoing deactivation. There are three other research reactors that are either operating or are being maintained in a standby condition. There are also two large hot cell facilities within ANL-W that are dedicated to spent nuclear fuel reprocessing research, development, and demonstration. ANL-W has a fire station, a cafeteria, and a small medical dispensary. ANL-W facilities are administered by the DOE Chicago Operations Office until Fiscal Year 2005, when the DOE Idaho Operations Office will become the administrator. ANL-W will have a long-term mission as an NE research and development facility. The facilities at ANL-W will be major assets in implementing future nuclear energy missions.

Figure 4-8. Aerial view of Argonne National Laboratory-West.

The *Final Record of Decision, Argonne National Laboratory-West, Operable Unit 9-04* (ANL-W 1998) was signed for the ANL-W OUs on September 29, 1998. Sites being remediated under the ROD include open ditches, an excavated soil mound, and the Industrial Waste Pond. Contaminants are found in ditch and pond sediments at a depth of less than 3 ft below land surface. Contaminants in the ditch sediments include nonradioactive metals such as chromium, mercury, zinc, and silver. These contaminants originated from historical use of industrial water treatment chemicals and photographic process discharges. Contaminants in the soil mound and Industrial Waste Pond sediments include cesium-137. A map showing current human health risk sites at ANL-W is shown in Figure 4-8a1.

4.8.1 Current State

The OU 9-04 ROD (ANL-W 1998) addresses remedial actions for the following eight release sites within ANL-W that may present an unacceptable risk to human health and the environment:

- Industrial Waste Pond sediments (ANL-01)
- Ditch A (ANL-01)
- Ditch B (ANL-01)
- Main Cooling Tower Blowdown Ditch (ANL-01A)
- Sewage Lagoon sediments (ANL-04)
- Interceptor Canal—canal portion (ANL-09)
- Interceptor Canal—excavated soil mound (ANL-09)
- Industrial Waste Lift Station Discharge Ditch (ANL-35).

Three release sites pose potentially unacceptable risks to human health. These are the Industrial Waste Pond sediments (ANL-01), Interceptor Canal, and Interceptor Canal excavated soil mound (ANL-09). The Industrial Waste Pond and Interceptor Canal sites have shallow-depth cesium-137 contamination resulting from an inadvertent discharge of radioactive liquid waste from the ANL-W analytical laboratory in 1969. A conceptual site model was developed as part of the *Comprehensive RI/FS for Argonne National Laboratory-West Operable Unit 9-04 at the INEEL (Final)* (ANL-W 1997). This model has been updated to reflect 2003 conditions and is shown in Figure 4-8a2.

Four sites in OU 9-04 underwent phytoremediation for 4 years (1999–2002) and now have reduced concentrations of contaminants. These sites are the Interceptor Canal—excavated soil mound (ANL-09), the Industrial Waste Lift Station Discharge Ditch (ANL-35), the Main Cooling Tower Blowdown Ditch (ANL-01A), and Ditch A (ANL-01). These four sites were sampled in 2003 to verify that the remediation goals in the ROD had been met. Sample results received in November of 2003 verified that remediation goals were met in three of the four sites. The Ditch A (ANL-01) site did not reach the ROD remediation goal for mercury, and its sediments will be excavated in Fiscal Year 2004. The excavated soil will be disposed of in the ICDF.

4.8.2 End State

The Interceptor Canal also will remain an occupational health risk site while its cesium-137 contamination decays (50 years). The Ditch B site was excavated in 1999 and poses no further risk. The Industrial Waste Pond sediments also are scheduled for excavation and disposal in Fiscal Year 2004. The Industrial Waste Pond will pose no further risk to human health after its remediation. ANL-W Sewage Lagoon sediments (ANL-04) will remain active at least until the 2035 timeframe. The lagoons have low concentrations of mercury in the sediments that pose a risk to ecological receptors only. The sewage lagoon sediments will be excavated and disposed of in an appropriate landfill when the lagoons are closed sometime after 2035.

The two ANL-W sites that would pose an unacceptable risk to occupational health risk in 2035 are the Interceptor Canal excavated soil mound (ANL-09) and the Interceptor Canal itself. A map of the risk-based end state is provided as Figure 4-8b1, and the conceptual site model for the end state is shown in Figure 4-8b2. The risk from these sites will gradually diminish as the residual cesium-137 contaminants decay away. Both sites will pose no risk to occupational (worker) health by 2053. Institutional controls currently in place at the Interceptor Canal soil mound and the Interceptor Canal itself provide protection for human receptors. Both sites are posted to prevent access, and ANL-W procedures document precautions to be taken while working near these areas.

4.8.3 Variances

No potential variances have been identified for ANL-W.

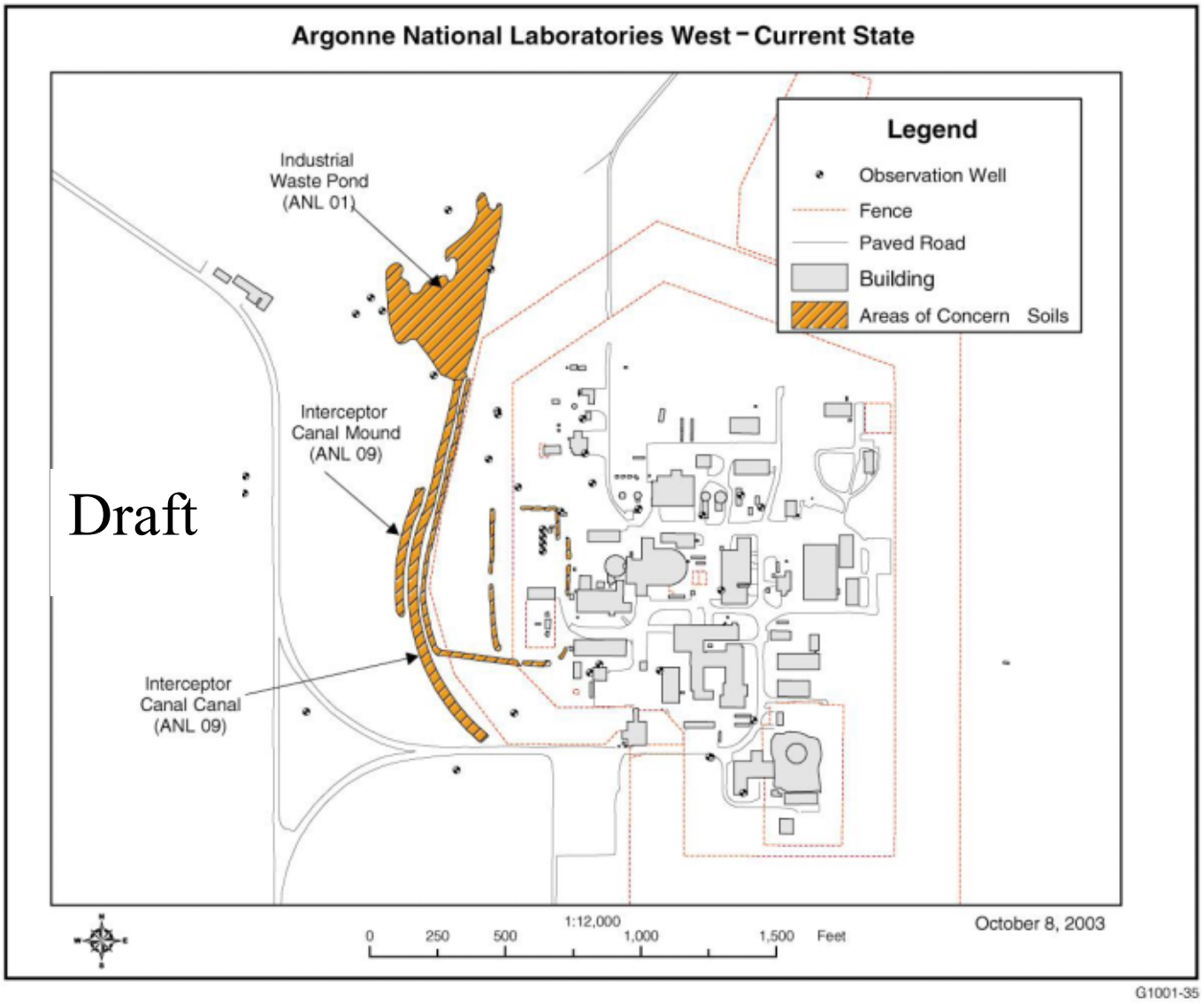

Figure 4-8a1. Argonne National Laboratory-West map—current state.

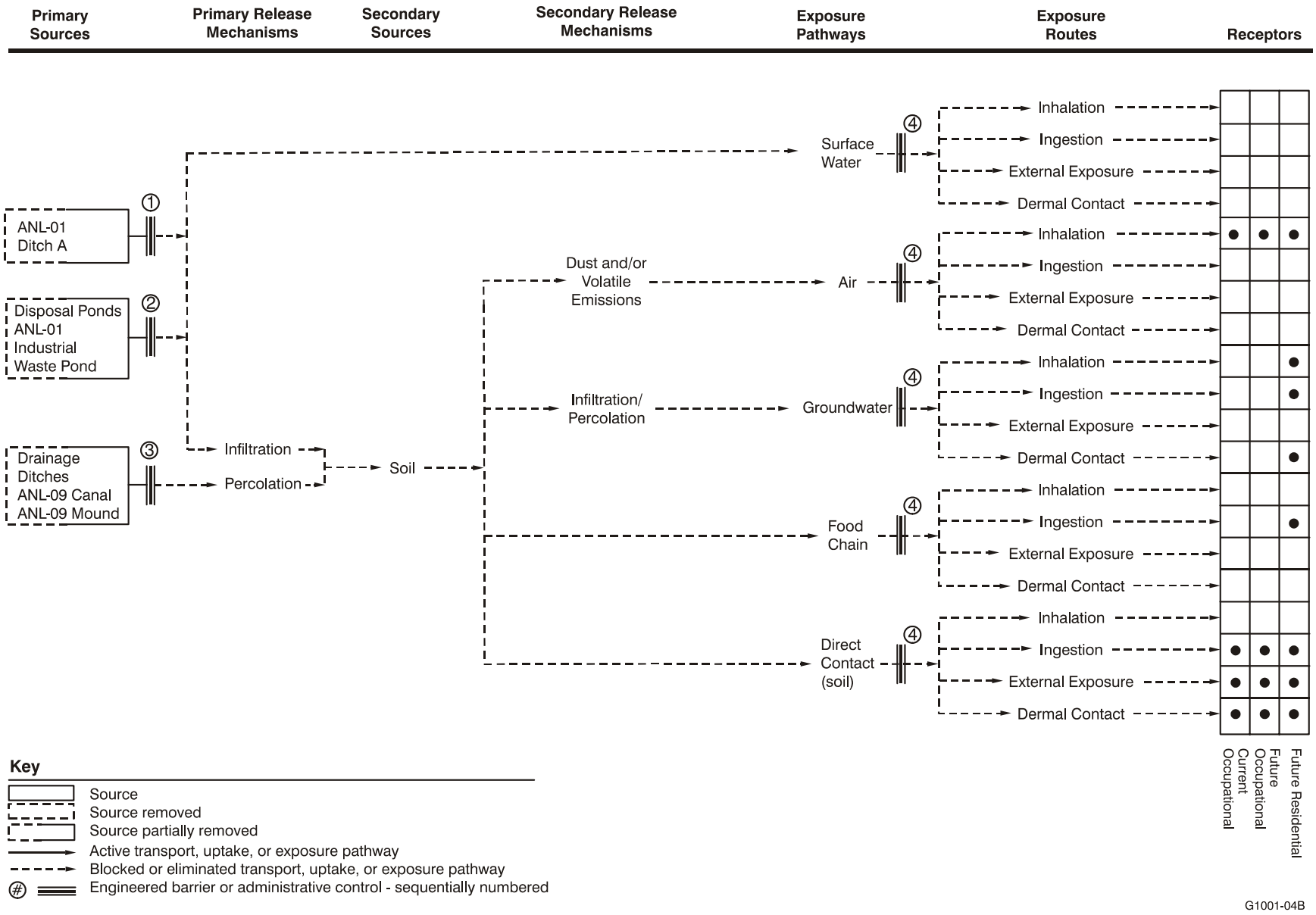

Figure 4-8a2. Argonne National Laboratory-West conceptual site model—current state.

Narrative for Figure 4-8a2 Argonne National Laboratory-West Conceptual Site Model—Current State

There are currently four areas where institutional controls are in place because residual contamination precludes unrestricted access. These areas include:

- One operating storm water and cooling tower water discharge pond (ANL-01 Industrial Waste Pond)
- One storm water drainage ditch (ANL-09 Interceptor Canal)
- One mound of soil dredged from the Interceptor Canal (ANL-09 Interceptor Canal mound)
- One drainage ditch with shallow-depth nonradioactive metal contamination in soil (ANL-01 Ditch A).

The steps taken to mitigate or remove these hazards are as follows:

1. The ANL-01 Ditch A underwent phytoremediation from 1999 to 2002. One contaminant, mercury, remains at levels slightly above remediation goals. The Ditch A soil with residual mercury contamination will be excavated in fiscal year 2004, and the soil will be disposed of in the ICDF. No long-term institutional controls will be required for Ditch A after excavation.

2. The selected remedy for the ANL-01 Industrial Waste Pond was extraction of the pond sediment contaminants by phytoremediation. This pond has been in use since 1960 to provide storm water and cooling tower drainage for the ANL-W site. There was an inadvertent discharge of radioactive liquids in the late 1960s, and the discharge of industrial cooling tower water was treated with toxic metal slimicides. The pond sediments are contaminated with cesium-137, chromium-3, selenium, mercury, and zinc. The Industrial Waste Pond will be remediated in fiscal year 2004 by implementing the ROD contingent remedy of excavation and disposal of sediments that are contaminated to levels above remediation goals. The excavated soil would be transported to the ICDF. No long-term institutional controls will be required for the Industrial Waste Pond site after it is excavated.

3. The ANL-09 Interceptor Canal has long-term institutional controls in place to protect workers from exposure to residual cesium-137 contamination until 2023. Workers are protected by posted signs and through the work control process.

   The ANL-09 Interceptor Canal mound soil was leveled and remediated to ROD remediation goals using phytoremediation from 1999 to 2002. Long-term institutional controls (i.e., posted signs, work controls, and site access controls) are in place to protect workers and the public from exposure to residual cesium-137 contamination. The remaining cesium contamination will decay to unrestricted-worker-use levels by 2053 and unrestricted residential-use levels by 2098.

4. The entire INEEL Site has restricted access to prevent intrusion by the public. Workers are protected through posting of signs at contaminated sites, by recording contaminated sites in the Site institutional controls database, and through the work control process used to identify hazards and mitigation measures for planned work activities. Precautions to be taken while working near these areas are documented in ANL-W procedures.

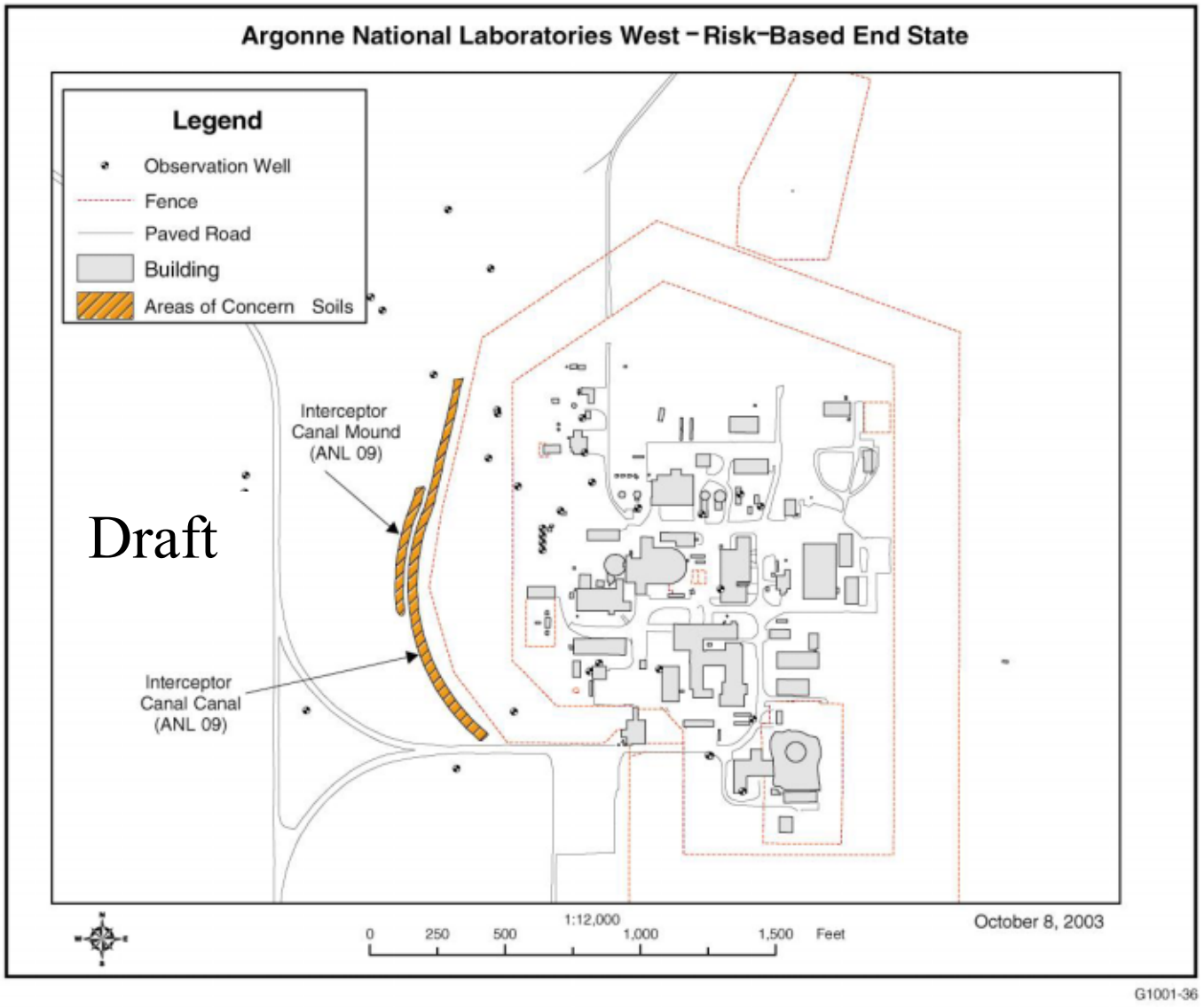

Figure 4-8b1. Argonne National Laboratory-West map—risk-based end state.

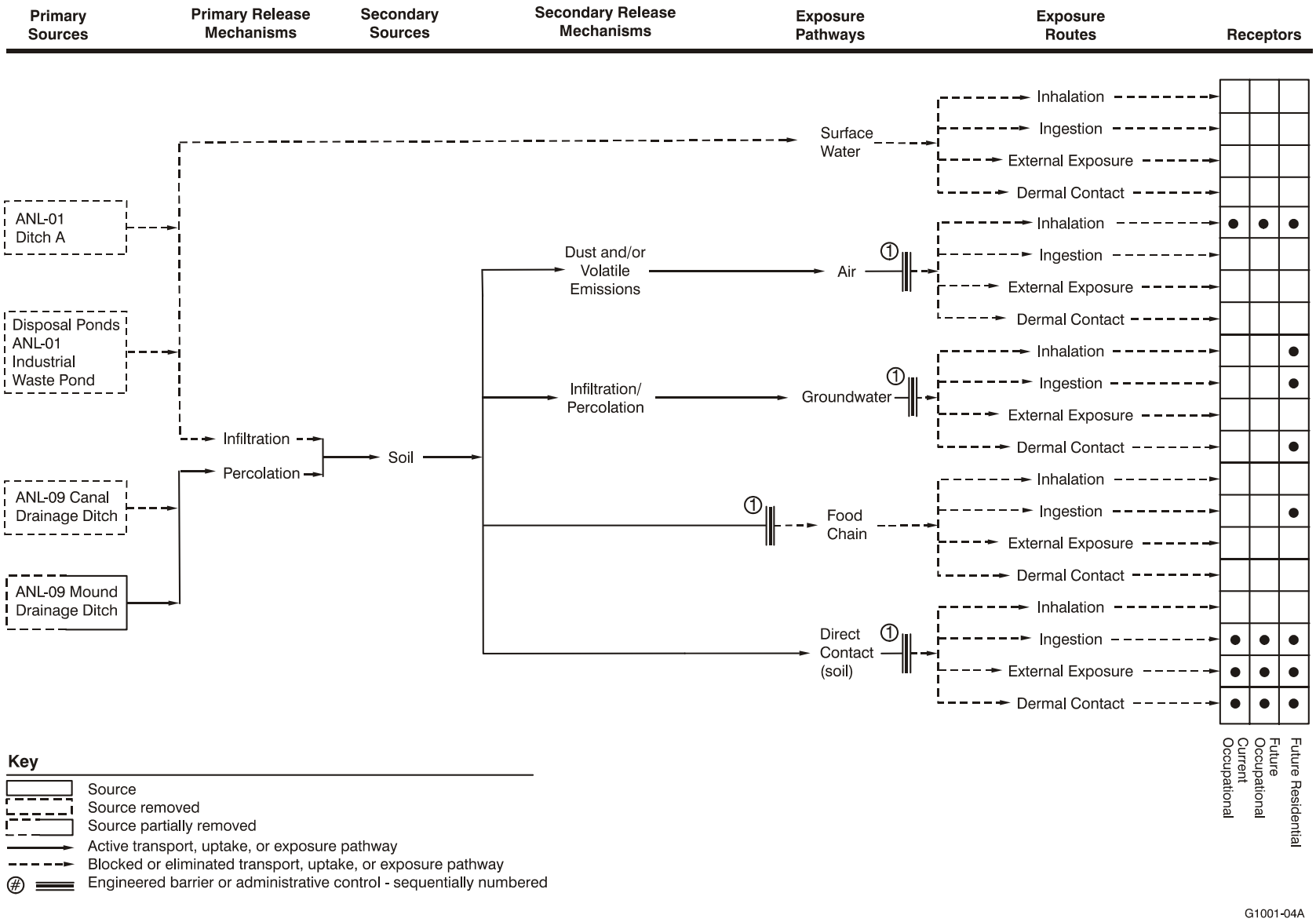

Figure 4-8b2. Argonne National Laboratory-West conceptual site model—risk-based end state.

Narrative for Figure 4-8b2 Argonne National Laboratory-West Conceptual Site Model—Risk-Based End State

It is anticipated that the following two sites at ANL-W will require institutional controls because of residual cesium-137 contamination:

- One storm water drainage ditch (ANL-09 Interceptor Canal)
- One mound of soil dredged from the Interceptor Canal (ANL-09 Interceptor Canal mound).

The steps taken to mitigate or remove these hazards are as follows:

1. Long-term institutional controls will be required at the ANL-09 Interceptor Canal mound site until 2098 to protect hypothetical residential receptors. The site will have restricted access to prevent intrusion by the public. Institutional controls to protect workers will be required until 2053. These controls include posted signs and work control processes that limit worker activities in this area.